Can I Afford to Seed Novel-Endophyte Tall Fescue?

Kenny Burdine
Extension Economist
University of Kentucky

Tall fescue is the predominant forage grass of Kentucky. It is an easily established, relatively persistent bunchgrass that has reasonable drought tolerance and does well in clay or loam soils. However, the endophyte fungus found in the grass was linked to poor animal performance in the late 1970's (Ball, Hoveland, and Lacefield). It has been estimated that 85% of Kentucky's fescue pastures are endophyte infected, making it a serious problem for Kentucky cattle producers (Lacefield, Henning, and Philips). Producers interested in establishing or replacing tall fescue stands have several options available to them.

Traditional Endophyte infected fescue can still be purchased through most agricultural input suppliers. There are also endophyte-free tall fescue varieties that are a little more expensive. Endophyte free varieties offer improved animal performance, but also lack some of the advantages that traditional fescue offers, most importantly, persistence. More recently, novel-endophyte varieties have become available. These varieties contain a non-harmful endophyte fungus which has many of the benefits of both endophyte-infected and endophyte-free varieties. They offer animal performance similar to non-endophyte varieties, but stands are likely to persist much longer.

Producers are often surprised at the huge cost difference that exists between varieties of tall fescue seed. While prices vary by location, E+ fescue seed will likely be the least expensive. Endophyte-free seed might cost 15 – 20% more, while novel-endophyte seed may cost three times as much. This price difference causes many forage producers to avoid purchasing novel endophyte varieties. The purpose of this analysis is to examine the conditions under which the more expensive variety might make economic sense.

I want to examine this question in two specific situations. Producers establishing pastures from scratch are likely to spend money on fertilizer, lime, labor, and machinery, in addition to seed costs. A sample budget is shown below in Table 1.

Table 1. A Simple Novel-Endophyte Fescue Pasture Establishment Budget

EXPECTED COSTS	Quantity	Unit	Price / Unit	Annual Cost
Grass Seed	**20**	lbs	**$4.00**	$80.00
Legume Seed	**12**	lbs	**$2.50**	$30.00
Lime	**2**	tons	**$15.00**	$30.00
Nitrogen	**30**	lbs	**$0.55**	$16.50
Phosphate	**60**	lbs	**$0.35**	$21.00
Potash	**40**	lbs	**$0.35**	$14.00
Machinery Charge	**1**	acre	**$15.00**	$15.00
Other	**0**	units	**$0.00**	$0.00
Other	**0**	units	**$0.00**	$0.00
TOTAL COST				**$206.50**

Notice that in Table 1, grass seed made up less than 40% of pasture establishment costs. In this scenario, novel-endophyte fescue seed was assumed to cost around $4.00 per pound, and it was further assumed that 20 lbs of seed were sown per acre. If traditional fescue seed were sown at a price of $1.50 per pound, seed cost would drop to $30 per acre, but total establishment costs would still exceed $150 per acre based on the assumptions made in Table 1. In other words, although E+ fescue seed may cost less than half as much per pound, the total pasture establishment costs per acre would only decrease by about 25%.

Another key point is that establishment costs are incurred in the first year and include the cost of fescue seed as shown in Table 1. Maintenance costs are incurred in subsequent years when the stand is established and in production. Seed costs are significant, but are only incurred in year one and still represent only a percentage of total grazing costs.

The same case could also be made for the producer who is considering replacing an existing stand of fescue with a novel-endophyte variety. Again, seed costs will only be part of the total cost of establishment. In the case of replacement, fescue seed costs are likely to make-up an even smaller percentage of total costs because additional money would be spent eliminating the original stand.

For the purposes of this discussion, we will assume that endophyte-infected fescue seed costs $1.50 per pound, non-endophyte seed costs $2.00 per pound, and novel-endophyte seed costs $4.00 per pound. These prices were based on a telephone discussion with a common input supplier in December of 2006. We will also assume that other costs of establishing the pasture are the same, so the only difference in establishment cost is the difference in seed costs. We will further assume that a seeding rate of 20 pounds per acre is used. Based on these assumptions, seeding

novel-endophyte fescue costs approximately $50 more per acre than E+ varieties and $40 more per acre than E- varieties.

Pasture establishment is a multi-year investment. Research is ongoing on the persistence of novel-endophyte varieties, but stands are likely to last 10 years or better if managed properly. When additional seed costs are spread over 10 years, the price difference really seems small. The rest of this discussion will be focused on whether this additional expense can be recouped through increased animal performance.

As mentioned before, the primary advantage of novel-endophyte varieties over infected varieties is animal performance. Stocker gains are often 50-100% better on novel varieties. Conception rates of cows on E+ fescue are often 20-40% lower than on novel varieties; weaning weights are often smaller as well due to decreased milk production (Ball, Hoveland, and Lacefield). These types of performance differences can easily offset the additional expense associated with novel-endophyte varieties.

A cow herd with an average weaning weight of 500 pounds, that experiences only a 10% increase in conception rates, will wean 50 more lbs of calf per cow. If we value these additional pounds at $80 per cwt., that would mean an additional $40 of revenue per cow assuming there was no increase in weaning weights. This translates to $20 per acre, if we assume two acres per cow-calf unit. Most producers would be willing to spend $50 for an investment that would yield an additional $20 per year over a ten year stand life. This is an appropriate way for cow-calf producers to look at this decision.

For the stocker operator, let's assume that rates of gain increase by 0.5 lbs per animal per day. Over a 5 month backgrounding period, this would mean an additional 75 pounds to sell. If we value these additional pounds at $70 per cwt., this represents an additional $52.50 per stocker. If we assume a stocking rate of 1.5 acres per stocker, this is $35 per acre. Again, a producer being offered a $50 investment that would yield a return of $35 per year over 10 years would most likely consider this an attractive investment.

Finally, if we want to compare novel-endophyte varieties to endophyte-free varieties, animal performance is likely to be very similar. In fact, many studies have found no statistical difference. However, endophyte free varieties are much less tolerant to drought and overgrazing. Based on the prices mentioned earlier, sowing novel varieties would cost about $40 more per acre. If the life of the novel-endophyte stand exceeds the endophyte-free variety by 5 years, the novel variety remains the best investment. In other words, it would be more economically efficient to establish a stand of novel-endophyte fescue every ten years than it would be to establish an endophyte-free stand every 5 years.

As producers make these types of decisions, the best way to look at a forage program is as an investment. The money that is spent establishing and maintaining forages is spent in order to receive a return over time. The primary purpose of this

discussion was to provide an investment framework for producers looking at their fescue options. Minimizing expense is not always the best way to make these decisions. Producers should think about how their money can best be spent. In the case of novel-endophyte fescue, a little additional money on seed could be a good investment over the life of the stand. The following publications were utilized in this analysis and are excellent sources of information for producers considering fescue options:

Ball, D.M., C.S. Hoveland, and G.D. Lacefield. *Southern Forages*. Potash and Phosphate Institute and the Foundation for Agronomic Research. Third Edition. 2002.

Ball, D.M., S.P. Schmidt, G.D. Lacefield, C.S. Hoveland, and W.C. Young III. Oregon Tall Fescue Commission Special Publication. "Tall Fescue Endophyte Concepts." 1-03. 2003.

Burdine, Kenny and Richard Trimble. "The Economics of Replacing Endophyte Infected Fescue." Agricultural Economics AEC 2005-01C. April 2005.

Lacefield, G.D., J.C. Henning, and T.D. Phillips. "Tall Fescue". AGR-39.